~~This is a stab a writing implementable and testable requirements.~~
~~Source – upper level mission requirements, if any. otherwise "derived"~~
~~Comments – clarification, examples~~

Functional and Performance Requirements for the GLAST Observation Scheduler

Source – upper level mission requirements, if any. otherwise "derived"
Comments – clarification, examples

Requirement Number	Requirement	Source	Comments
SCH-010	The observation scheduler shall ingest proposals from the proposal database The proposal information ingested and used to create a science target list in the scheduler will include, source coordinates, source name, observation duration, observation constraints, observation priority (e.g. class "A", "B" and "C" targets) and proposer information.		Refer to database definition document.
SCH-020	The observation scheduler shall accept manual additions to the science target list.		
SCH-030	The observation scheduler shall automatically construct long term observation schedules (LTS) containing both sky survey and pointed observations. The LTS is required to assign targets with a time resolution of one week or finer. ~~The LTS is required to assign targets to one week bins.~~		Long-term means on the order of 1 year. Make another requirment for "but is allowed do more finer grained scheduling"
SCH-040	The observation scheduler shall give preferential scheduling to higher priority targets (e.g. schedule "A" targets before "C")		
SCH-050	The observation scheduler shall automatically construct short term observation schedules (STS) containing both sky survey and pointed observations. An STS will contain complete observation specifications (e.g. start and end times of pointed and sky survey observations.) The observations are scheduled at a resolution of 1 minute.		Short-term schedule is on the order of ~1 week.
SCH-060	The observation scheduler shall take observation constraints into account when constructing either the STS and the LTS .		
SCH-065	In the event of conflicting constraints the user must be able to override one or more of the constraints.~~these.~~		(This refers to e.g.making an observation at a particular time

			rather than safety constraints - which we don't have yet!)~~This requirement needs to be clarified.~~
SCH-070	The observation scheduler shall optimize the observation schedule.		Define "optimize" Spend as much time as possible collecting science data. E.g. try to slew during SAA. Make sure we choose another target when the current target is occulted.
SCH-071	The observation scheduler shall minimize interruptions to pointed observations as a user-selectable option		
SCH-080	The observation scheduler shall provide an interactive schedule editor with functions which include: allowing the user to visualize schedules and constraints affecting the placement of observations, allowing the user to place and reposition observations in order to build and improve schedules.		
SCH-090	The observation scheduler shall output schedules either in a user specified format or in a format that can easily be converted to a desired format.		user-specified format?
SCH-095	The observation scheduler shall output schedule files in the science activity timeline format used by the MOC mission planning software.		Refer to Operations Data Products ICD
SCH-100	The observation scheduler shall utilize variety of user-specified algorithms in constructing long term schedules.		user-specified algorithms? This requirement needs to be more specific.
SCH-110	The observation scheduler shall apply time-based scheduling constraints to observations		
SCH-111	The observation scheduler shall allow an observation to be scheduled during a user-specified UT time range		
SCH-112	The observation scheduler shall allow an observation to be scheduled to start at a user-specified time of day		
SCH-113	The observation scheduler shall allow an observation to be scheduled to start during Binary star phase		(Some sources of high energy emission are binary star systems.

			Two stars in orbit around each other. It may be desirable to make observations at a particular phase of the orbit. So, the requirement isn't to observe at one particular time but at any time when the stars are in the same orientation. e.g. if one star eclipses the other every 12 days then the observing constraint would be met every 12 days.) (MJM: Yikes!)~~(MJM doesn't know what this means)~~
SCH-114	The observation scheduler shall allow an observation to be scheduled for Recurrent monitoring with specified intervals		
	?Any requirement for scheduling based on orbit? Swift decided too late that they want that.		
SCH-120	The observation scheduler shall take LAT properties into account when scheduling observations		
SCH-121	The observation scheduler shall consider the large field of view of the LAT in determining if a target is observable.		
SCH-122	The observation scheduler shall allow the user to define a constraint for the need to avoid the Earth limb entering the central LAT FOV.		
SCH-123	The observation scheduler shall allow the user to define the optimum pointing position in the LAT FOV.The center of the FOV may not be the optimum pointing position for pointed observations and instead an offset "sweet spot" (or annulus) may be used.		The center of the FOV may not be the optimum pointing position for pointed observations and instead an offset "sweet spot" (or annulus) may be used.
SCH-130	The observation scheduler shall ingest the orbital ephemeris for the spacecraft, Sun, Earth,~~ and Moon~~ in order to compute obscuration zones.		Is there a different constraint for full moon/new moon
SCH-131	The observation scheduler shall ingest the TDRS satellite ephemeredes.		Use to compute TDRSS access during pointing
SCH-140	The observation scheduler shall predict Earth occultation of targets and		Is there a different constraint for

	construct observation schedules that avoid Earth occultation.		light earth / dark eartch? umbra/penumbra? NO
SCH-150	The observation scheduler shall utilize the onboard polygon defined SAA region in scheduling LAT observations.		~~Assuming we don't need to consider the GBM SAA polygon?~~
SCH-160	The observation scheduler shall incorporate commanding provided by the GLAST instrument teams in what?		Include commanding in scheduling constraint or just in timeline? (When I wrote the original I was only thinking of including the commanding in the timeline. It is possible we might want to make some constraints on the scheduling - e.g. not do any pointed observations during certain types of commanding. i.e. black out certain periods in a similar way to having an SAA passage.
~~SCH-200~~	~~The observation scheduler shall execute on a standard computer system such as LINUX or MS Windows that can be maintained by LHEA system administrators.~~		~~Do you just want to require TAKO to run on LINUX? Otherwise we'll have to always test TAKO on both platforms.~~
	~~Able to be maintained for the maximum foreseeable lifetime of GLAST.~~		~~Need to delete it because it is not a functional or performance requirement~~ ~~This was a trade study requirement, right?~~
	~~Able to be modified with additional capabilities as new requirements are found. (There are currently no spacecraft constraints but, if the situation changes, these must be able to be incorporated.)~~		~~Testable?~~ ~~Probably remove or rewrite this if possible~~
SCH-170	The observation scheduler shall ensure that potential TDRSS contacts		TDRSS contacts will be arranged

	are not lost when constructing the STS.		by the MOC based on the science timeline provided by the GSSC. If this results in an insufficient number of TDRSS contacts and significant science data is lost
	While there are no spacecraft constraints there are "desirements" (e.g. avoiding blocking all three star trackers simultaneously). It is therefore preferable if the scheduler can include this in constructing observation plans.		Try to make this into a requirement to support a certain constraint.
	~~The GLAST computer system consists primarily of LINUX machines. It is desirable for the scheduler to be able to run on LINUX.~~		~~see SCH-200~~
	This starts toward making TAKO a planner rather than just a scheduler. It is asking TAKO to create pointing rather than just scheduling pointings.		
SCH-180	The observation scheduler shall support multiplexing of observations (simultaneous observations of more than one target utilizing the LAT's large field of view).		In addition to basic sky survey and pointed observations "advanced" observation types may be desired.
SCH-190	The observation scheduler shall supportI "pointed survey" observations where the LAT's pointing direction is changed while maintaining a source within the FOV.		(should be separated from the other functional requirements. i.e. it's not yet decide this is worthwhile doing.)
	~~It would be desirable to have the source code available to ensure maintainability of the code for the entire GLAST mission lifetime and to facilitate the addition of presently unanticipated requirements.~~		~~Not a functional requirement~~
SCH-200	The observation scheduler shall execute on a typical LINUX computer system that can be maintained by LHEA system administrators.		

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R.Corbet's clarifications (6/23/04)